Archeological Impacts of Climate Change at Biscayne National Park

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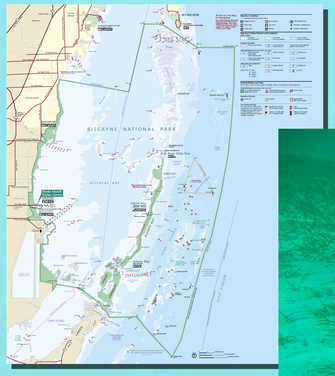
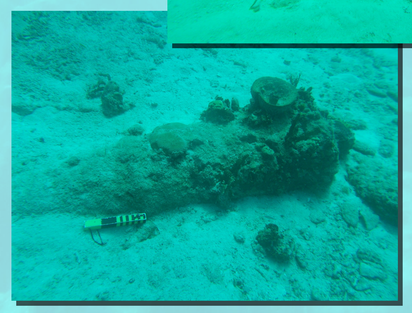
ABSTRACT

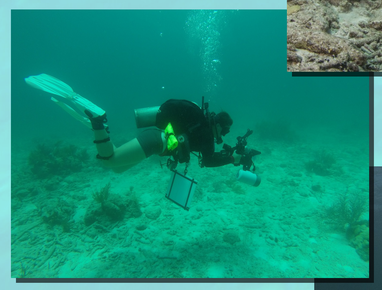
Coastal impacts of climate change, including shifts in sea level, erosion, and the frequency and strength of storms and tidal surges, are highly significant to the resource managers of Biscayne National Park. The nation's largest marine National Park protects over 130 archeological sites. As 95% of the park's lands are submerged in the waters surrounding south Florida, many of these cultural heritage remains are particularly vulnerable to climate change impacts. This project focuses on the documentation and monitoring of imperiled sites by surveying ongoing climate change impacts to shoreline and submerged archeological remains.

INTRODUCTION

The preservation of archeological sites is always a major consideration for cultural heritage managers. The prospect of managing submerged sites, particularly in the face of a changing global climate and its corresponding implications to underwater and coastal regions, is especially challenging. Biscayne National Park offers a perfect opportunity to research archeological site vulnerabilities. Located south of Miami, Florida, the Park boundaries include many islands between Key Largo and Key Biscayne, the northern Florida Coral Reef tract, and the longest mangrove shoreline in the eastern United States. It holds a variety of prehistoric, colonial, and American historical terrestrial sites, and—fitting for a marine park—it is home to a vast collection of shipwrecks. These sites are in danger of erosion, which can both sweep shoreline sites away with increased tidal surges, and disrupt sand cover, seagrass protection, and the stability of submerged sites. This project entails the documentation of high-risk sites, and will assess the possibilities open to Park managers seeking to manage the impacts of climate change to these non-renewable cultural resources.







METHODS

Before I could begin any underwater work at Biscayne, I first had to pass the Blue Card assessment, a rigorous diving and swimming exam required for all NPS diving personnel. Once successfully completed, my next step was to begin completing annual condition assessments on archeological sites. Sites are scheduled for assessments based on determined threats, both natural and human, and thus some sites are assessed semi-annually, annually, or even every five years. These assessments, including detailed photography, provide baseline data on sites' conditions, some going back thirty years—essential information for determining changes in site exposure or deterioration. Research into the geomorphology of particularly vulnerable and historically significant sites will assist in the development of management plans for the sites' continued preservation. Additionally, this project offers an opportunity to participate in two major site stabilization projects, one underwater and one terrestrial. These projects offer insights into potential methodologies for threat mitigation at other sites within the park.

RESULTS

The final products of this project will include the completion of condition assessments on over 50 sites, including photography, and advanced mapping and documentation as needed. Additionally, I will prepare a report identifying site vulnerabilities, and proposing site prioritization for threat mitigations. The development of management strategies to address climate change impacts will not only assist the resource managers of Biscayne National Park, but will also assist in proposed doctoral research.

DISCUSSION

While many of the Mosaics in Science participants are near the ends of their projects, mine has just begun. Thus, while my work plan and products are discussed above, this project itself will complete in October. In beginning the work, however, of particular interest is the fact that very little has been published or researched on the archeological impacts of climate change, especially with submerged sites. In situ conservation projects have been undertaken in sites around the world, but usually as a function of threat mitigation: some of these strategies are responses to sediment erosion or as site stabilization projects, but many more are reactions to human threats, such as treasure hunters or commercial fishing trawlers. While some of the resultant methods for site preservation might be the same, research into climate change as an underwater archeological resource threat has rarely been examined. A challenge for this project will include research into other disciplines' reactions to and research in climate change response, as well as in analyzing geomorphology and erosion patterns--not commonly acquired skills for archeologists. Developing my skills in GIS will be of critical importance, as well as the practical requirements of accessing the sites: gaining experience operating small watercraft in the open ocean, and practicing safe diving habits. These experiences are invaluable opportunities to build my professional career and contribute to the body of knowledge devoted to protecting and preserving cultural heritage resources.

ACKNOWLEDGEMENTS

Many thanks to the wonderful archeologists of Biscayne National Park, Chuck Lawson and Josh Marano, and The Geological Society of America Education and Outreach Programmers Matthew Dawson and Allison Kerns, for making this Mosaics in Science internship possible.

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